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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/717,068	11/22/2000	In-Jea Chung	8733.329.00	2403

30827 7590 05/08/2003

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/717,068	CHUNG ET AL.
	Examiner Andrew Schechter	Art Unit 2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 14 February 2003.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-20 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____.
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.	6) <input type="checkbox"/> Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 14 February 2003 have been fully considered but they are not persuasive.

The applicants have amended claim 1 to recite the limitation "forming a seal material at edges of the first substrate after depositing the liquid crystal material". This distinguishes the claim from the method of *Harada*, which explicitly discloses forming the seal before depositing the liquid crystal material. The previous rejection is therefore withdrawn.

Regarding claims 12 and 20, the applicants argue that none of the cited references teach or suggest the limitation that the liquid crystal material has "a viscosity of greater than 100 mm²/sec." The examiner had reasoned that *Harada* describes the ferroelectric liquid crystal material it uses as being much more viscous than nematic liquid crystals, whose viscosity is about 20-50 mm²/sec (according to *Asano* and the applicants, see p. 4 of the previous Office Action); thus there seemed to be a clear rationale to believe that the viscosity of *Harada*'s material was either inherently in the recited range or it would be obvious to have it so. The applicants argued in response that it was not inherent (since *Harada*'s viscosity could be 90 mm²/sec, say, without contradicting any of the statements made) and there is no teaching in the prior art that would establish it was obvious to have the viscosity be greater than 100 mm²/sec. The examiner agrees with this assessment and withdraws the previous rejections.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harada et al.*, U.S. Patent No. 5,361,152 in view of *Yamamoto*, Japanese Patent Document No. 59-195222 and *Mochizuki et al.*, U.S. Patent No. 5,348,685.

Harada discloses a fabricating method for a LCD comprising providing two substrates [1, 4], forming orientation films on them [col. 3, lines 1-4], depositing a liquid crystal material [col. 3, line 52 – col. 4, line 1], forming a seal material [2] at the edges of one substrate, attaching the substrates [col. 5, lines 34-35], and heat-treating the liquid crystal material to lower the viscosity [col. 5, lines 40-45].

Harada does not disclose forming a seal material after depositing the liquid crystal material. Also, *Harada* deposits high viscosity ferroelectric liquid crystals and heat-treats them to lower their viscosity to the nematic viscosity range, but does not disclose explicit values of the viscosities of the liquid crystal when it is deposited to compare to the claimed ranges.

On the first point, *Yamamoto* does disclose forming a seal material after depositing the liquid crystal [see the series of steps in Fig. 3]. It would be obvious to

one of ordinary skill in the art to use the method of *Yamamoto* in making the device of *Harada*, motivated by *Yamamoto*'s teaching that this method makes it possible "to remove excessive liquid crystal" and seal the panel so that "the sealing resin is not spread" and a "wide display window can be obtained" [see p. 5 of the translation]. (The examiner notes that these are advantages over the reverse order, placing the seal down first; *Yamamoto* also offers additional advantages in this passage over the injection method.)

Still on the first point, the examiner notes two differences between the method of *Yamamoto* and that of the present specification: in the present invention, the seal is placed on the first substrate before the substrates are attached to each other, while *Yamamoto* attaches them and then adds the seal; and the seal in the present invention is between the two substrates, while in *Yamamoto* it is on one substrate and outside the other substrate.

On the second point, *Mochizuki* discloses ferroelectric liquid crystal compositions for use in analogous LCDs, and also explicitly discloses the viscosities of these compositions. In Table 2, *Mochizuki* discloses the room temperature viscosities of various ferroelectric liquid crystal compositions, which range from 170 – 1020 mPa·sec (note that 1 mPa·sec is approximately equal to 1 mm²/sec, as discussed on p. 3 of the previous Office Action, so that these viscosities certainly lie within the recited ranges of greater than about 20-50 mm²/sec or greater than 100 mm²/sec). It would be obvious to one of ordinary skill in the art to use one of the ferroelectric liquid crystal compositions of *Mochizuki*, motivated by *Mochizuki*'s teaching that this provides "a ferroelectric

material generating a high-quantity [sic] image and excellent response characteristics" [col. 28, lines 32-44]. Claims 1 and 5 are therefore unpatentable.

Harada discloses heat-treating after attaching the substrates, and using a roller or dispenser to print the ferroelectric liquid crystal [col. 3, lines 51-55], so claims 3, 4, and 7 are also unpatentable.

4. Claims 6, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harada* in view of *Yamamoto* and *Mochizuki*, as applied to claims 1, 3, 4, 5, and 7 above.

The additional limitation of claims 6 and 12, over the claims previously discussed, is that the heat-treating activates the liquid crystal to have substantially the same characteristics as a liquid crystal material having a viscosity of 20 to 50 mm²/sec. The specification is silent on the question of what "substantially the same characteristics" means; in the context of this invention, the examiner interprets this to mean that the material flows easily to distribute itself within the liquid crystal cell.

As discussed above, *Harada* discloses heat-treating the liquid crystal material to have it change into a nematic phase, in order to render the liquid crystal homogeneous (by lowering the viscosity and allowing the material to flow easily into a uniform configuration) [col. 5, lines 21-45]. Therefore, following this interpretation, *Harada*'s heat-treating activates the liquid crystal material to have substantially the same characteristics as a liquid crystal material having a viscosity of 20 to 50 mm²/sec, so claims 6 and 12 are also unpatentable.

Harada discloses using a roller or dispenser to print the ferroelectric liquid crystal [col. 3, lines 51-55], so claims 14 and 15 are also unpatentable.

5. Claims 10, 11, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harada* in view of *Yamamoto* and *Mochizuki* as applied to claims 1 and 12 above, and further in view of *Kim et al.*, U.S. Patent No. 5,742,370.

Harada does not disclose spin-coating the FLC on, but this is an art-recognized equivalent to the other methods *Harada* does disclose, as evidenced by *Kim* which discloses liquid crystal "coated by spin-casting, roll coating, or spray coating method" [col. 3, lines 55-57]. One of ordinary skill in the art would find it obvious to use spin-coating with a rotating substrate, since it is equivalent to the disclosed method. Claims 10, 11, 18, and 19 are therefore unpatentable.

6. Claims 8, 9, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harada* in view of *Yamamoto* and *Mochizuki* as applied to claims 7 and 15 above, and further in view of *Abe*, U.S. Patent No. 5,511,591.

Harada does not disclose the details of how the dispenser works; *Abe* discloses a dispenser which repeatedly moves over the substrate in a preset manner while dispensing liquid crystal, presumably controlled by a preset program. [If not, such automation would be obvious to do. Also, in *Abe* the substrate moves and the dispenser is fixed; the relative motion is the same, however.] It would be obvious to one of ordinary skill in the art to use *Abe*'s dispenser with the process of *Harada*, motivated by *Abe*'s teaching that using it "can contribute greatly to productivity improvement

because the time for filling is so much reduced" [col. 9, lines 14-17]. Claims 8, 9, 16, and 17 are therefore unpatentable.

7. Claims 2, 13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harada* in view of *Yamamoto* and *Mochizuki* as applied to claims 1 and 12 above, and further in view of *Asano*, U.S. Patent No. 4,974,940.

Harada does not explicitly disclose the additional limitation of rubbing the orientation films, though this is so conventional one of ordinary skill in the art would likely take it to be inherent in the device of *Harada*. Regardless, *Asano* does disclose rubbing the orientation films, and one of ordinary skill in the art would be motivated to do so in the device of *Harada* by *Asano*'s teaching that "a rubbing method which is excellent for mass production can effectively be used" [col. 10, lines 3-5]. Claims 2, 13, and 20 are therefore unpatentable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-4711 for regular communications and (703) 746-4711 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Andrew Schechter
May 2, 2003

TOANTON
PRIMARY EXAMINER